

## **REMARKS**

Claims 8-21 are pending. The Examiner's reconsideration of the objections and rejections is respectfully requested in view of the amendments and remarks.

The disclosure has been objected to; the Examiner suggested that the Cross-Reference to Related Application be amended to include the U.S. Patent Number of the parent application. The Cross-Reference to Related Application has been amended accordingly. Reconsideration of the objection is respectfully requested.

Claims 8-11 and 14-19 have been rejected to under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-6 of U.S. Patent No. 6,665,033.

35 U.S.C. 121 prohibits the use of a patent issuing on an application with respect to which a requirement for restriction has been made, or on an application filed as a result of such a requirement, as a reference in a double patenting rejection against any divisional application, if the divisional application is filed before the issuance of the patent.

The present application is the result of a restriction requirement issued during the prosecution of the parent patent, U.S. Patent No. 6,665,033. The present application was filed before issuance of the patent. Therefore, the present rejection is prohibited. The Examiner's reconsideration of the rejection is respectfully requested.

Claims 8-11 and 14-19 have been rejected to under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-2, 5-7, 9, 12 and 14 of Katoh et al. (U.S. Patent No. 6,485,614).

Any rejection based on double patenting as between an application and patent must include a determination as to whether issuance of the application would provide unjustified

extension of the term of the right to exclude granted by a patent. Issuance of the present application would not provide such an extension of the term.

A patent granted on a continuation, divisional, or continuation-in-part application that was filed on or after June 8, 1995, will have a term which ends twenty years from the filing date of earliest application for which a benefit is claimed under 35 U.S.C. 121.

The present application is a divisional application of U.S. Patent No. 6,665,033. In the prosecution of U.S. Patent No. 6,665,033 a terminal disclaimer was filed with respect to Callegari. Thus, the lifetime of a patent granted on the present application will not result in a timewise extension. The Examiner's reconsideration of the present rejection is respectfully requested.

Claims 8, 10 and 11 have been rejected to under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-2, 9-11 and 17 of Callegari et al. (U.S. Patent No. 6,061,114).

Respectfully, the cited reference is believed to be patentably distinct from the claims of the present invention. For example, Callegari claims bombarding a surface with a material containing beam (see claim 1), whereas the present invention claims "quenching the surface with a reactive component to saturate dangling bonds on the surface."

The Examiner's reconsideration of the rejection is respectfully requested.

Claims 8, 10 and 11 have been rejected to under 35 U.S.C. 102(e) be being anticipated by Callegari (U.S. Patent No. 6,061,114).

Claim 8 claims, *inter alia*, "quenching the surface with a reactive component to saturate dangling bonds on the surface."

Callegari teaches a hydrogenated DLC alignment film (see col. 4, lines 27-31). Callegari teaches the ion bombardment of the alignment film together with gases; a saturation of the alignment film. Callegari does not teach “quenching the surface with a reactive component to saturate dangling bonds on the surface” as claimed in claim 8. Quenching is the treatment of a surface layer subsequent to ion bombardment (see page 16 lines 18-20 of the disclosure). Callegari does not teach a treatment of a surface layer subsequent to the ion bombardment. Therefore, Callegari fails to teach all the limitations of claim 8.

Claims 10 and 11 depend from claim 8. The dependent claims are believed to be allowable for at least the reasons given for claim 8. The Examiner’s reconsideration of the rejection is respectfully requested.

Claims 8, 10 and 11 have been rejected under 35 U.S.C. 102(b) as being anticipated by, or in the alternative, under 35 U.S.C. 103(a) as being obvious over IBM Tech. Disc. Bull., vol. 34, #4B (herein after the Bulletin). The Examiner stated essentially that the Bulletin teaches and/or suggests all the limitations of claims 8, 10 and 11.

Claim 8 claims, *inter alia*, “quenching the surface with a reactive component to saturate dangling bonds on the surface.”

The Bulletin teaches an ion bombardment with Nitrogen and Argon (see Figure 1). The Bulletin does not teach “quenching the surface with a reactive component to saturate dangling bonds on the surface” as claimed in claim 8. As stated above, quenching is the treatment of a surface layer subsequent to ion bombardment (see page 16 lines 18-20 of the disclosure). The Bulletin does not teach a treatment of a surface layer subsequent to the ion bombardment. Therefore, the Bulletin fails to teach all the limitations of claim 8.

Claims 10 and 11 depend from claim 8. The dependent claims are believed to be allowable for at least the reasons given for claim 8. The Examiner's reconsideration of the rejection is respectfully requested.

Claims 8, 12 and 13 have been rejected under 35 U.S.C. 102(b) as being anticipated by, or in the alternative, under 35 U.S.C. 103(a) as being obvious over Chaudhari et al. (5,770,826). The Examiner stated essentially that Chaudhari teaches and/or suggests all the limitations of claims 8, 12 and 13.

Claim 8 claims, *inter alia*, "quenching the surface with a reactive component to saturate dangling bonds on the surface."

Chaudhari teaches a low energy beam of Argon ions is used to bombard a surface of a polyimide film (see col. 2, lines 44-46). Chaudhari teaches the ion bombardment of the alignment film together with gases, e.g., Argon; a saturation of the polyimide film. Chaudhari does not teach "quenching the surface with a reactive component to saturate dangling bonds on the surface" as claimed in claim 8. Quenching is the treatment of a surface layer subsequent to ion bombardment (see page 16 lines 18-20 of the disclosure). Chaudhari does not teach a treatment of a surface layer subsequent to the ion bombardment. Therefore, Chaudhari fails to teach all the limitations of claim 8.

Claims 12 and 13 depend from claim 8. The dependent claims are believed to be allowable for at least the reasons given for claim 8. Reconsideration of the rejection is respectfully requested.

Claims 8, 12 and 13 have been rejected to under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 24, 25 and 34-36 of Andry et al. (U.S. Patent No. 6,724,449).

Respectfully, the cited reference is believed to be patentably distinct from the claims of the present invention. For example, Andry claims treating an alignment film with an ion beam (see claim 24), whereas the present invention claims “quenching the surface with a reactive component to saturate dangling bonds on the surface.”

The Examiner’s reconsideration of the rejection is respectfully requested.

Claims 8, 12 and 13 have been rejected under 35 U.S.C. 102(b) as being anticipated by Andry et al. (U.S. Patent No. 6,724,449). The Examiner stated essentially that Andry teaches all the limitations of claims 8, 12 and 13.

Claim 8 claims, *inter alia*, “quenching the surface with a reactive component to saturate dangling bonds on the surface.”

Andry teaches an ion bombardment of a homeotropic alignment surface, (see col. 5, lines 45-51). Andry teaches that subsequent to ion bombardment, two ion-beam-treated homeotropic alignment surfaces are assembled (see col. 5, lines 59-61). Andry does not teach “quenching the surface with a reactive component to saturate dangling bonds on the surface” as claimed in claim 8. Quenching is the treatment of a surface layer subsequent to ion bombardment (see page 16 lines 18-20 of the disclosure). Andry does not teach a treatment of a surface layer subsequent to the ion bombardment. Therefore, Andry fails to teach all the limitations of claim 8.

Claims 12 and 13 depend from claim 8. The dependent claims are believed to be allowable for at least the reasons given for claim 8. Reconsideration of the rejection is respectfully requested.

Claims 8, 12-14, 20 and 21 have been rejected under 35 U.S.C. 102(e) as being anticipated by Lien et al. (U.S. Patent No. 6,682,786). The Examiner stated essentially that Lien teaches all the limitations of claims 8, 12-14, 20 and 21.

Claim 8 claims, *inter alia*, “quenching the surface with a reactive component to saturate dangling bonds on the surface.” Claim 14 claims, *inter alia*, “saturating dangling bonds on the surface caused by the bombarding step; and quenching the surface with a reactive component to saturate dangling bonds on the surface.”

Lien teaches an exposing an alignment layer to an ion beam, (see col. 7, lines 4-7). Lien does not teach “quenching the surface with a reactive component to saturate dangling bonds on the surface” as claimed in claims 8 and 14. As stated above, quenching is the treatment of a surface layer subsequent to ion bombardment (see page 16 lines 18-20 of the disclosure). Lien does not teach a treatment of a surface layer subsequent to the ion bombardment. Therefore, Lien fails to teach all the limitations of claims 8 and 14.

Claims 12 and 13 depend from claim 8. Claims 20 and 21 depend from claim 14. The dependent claims are believed to be allowable for at least the reasons given for claims 8 and 14. The Examiner’s reconsideration of the rejection is respectfully requested.

Claims 8, 12-14, 20 and 21 have been rejected to under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 26 of Samant et al. (U.S. Patent No. 6,519,018).

Respectfully, Samant does not include a claim number 26. Further, the cited reference is believed to be patentably distinct from the claims of the present invention. For example, Samant claims bombarding a surface of an alignment structure with an ion beam (see claim 20), whereas the present invention claims “quenching the surface with a reactive component to saturate dangling bonds on the surface” in claim 8 and “saturating dangling bonds on the surface caused by the bombarding step; and quenching the surface with a reactive component to saturate dangling bonds on the surface” in claim 14.

The Examiner's reconsideration of the rejection is respectfully requested.

Claims 8, 12-14, 20 and 21 have been rejected under 35 U.S.C. 102(e) as being anticipated by Samant et al. (U.S. Patent No. 6,519,018). The Examiner stated essentially that Samant teaches all the limitations of claims 8, 12-14, 20 and 21.

Claim 8 claims, *inter alia*, "quenching the surface with a reactive component to saturate dangling bonds on the surface." Claim 14 claims, *inter alia*, "saturating dangling bonds on the surface caused by the bombarding step; and quenching the surface with a reactive component to saturate dangling bonds on the surface."

Samant teaches an ion bombardment (see col. 7, lines 11-36). Samant does not teach "quenching the surface with a reactive component to saturate dangling bonds on the surface" as claimed in claims 8 and 14. Quenching is the treatment of a surface layer subsequent to ion bombardment (see page 16 lines 18-20 of the disclosure). Samant does not teach a treatment of a surface layer subsequent to the ion bombardment. Therefore, Samant fails to teach all the limitations of claims 8 and 14.

Claims 12-14 depend from claim 8. Claims 20 and 21 depend from claim 14. The dependent claims are believed to be allowable for at least the reasons given for claims 8 and 14. The Examiner's reconsideration of the rejection is respectfully requested.

Claims 8, 10 and 11 were rejected under 35 U.S.C. 103(a) as unpatentable over Shimada et al., (US 5,030,322) or Nakabayahsi et al., (US 5,710,608) in view of Pierson et al., (US 2001/0025826 A1). The Examiner stated essentially that the combined teachings of Shimada and Pierson, or the combined teachings of Nakabayahsi and Pierson teach or suggest all the limitations of the rejected claims.


Multiple cited prior art references must suggest the desirability of being combined, and the references must be viewed without the benefit of hindsight afforded by the disclosure. The Examiner has chosen a multitude of references, apparently in hindsight, to reject claim 1, however, at least the Handschy reference relates to an entirely different art. For example, Shimada and Nakabayahsi teach methods for orienting films (see Abstracts) and Pierson teaches a method for etching indium phosphides (see paragraph [0005]). Pierson provides no teaching or suggestion whatsoever as to why a method for etching indium phosphides would be employed beyond fabrication of semiconductor structures, much less for orientation film. Pierson lacks a suggestion or motivation that such an etching method is desirable for an orientation film. Indeed, Pierson teaches away from a combination with an ion bombardment technique such as those taught by Shimada and Nakabayahsi; for example, see paragraph [0009] wherein Pierson states “the ICP-RIE process provides for precise feature etching by chemical reaction, as opposed to be direct bombardment (i.e., by force).” Given the different fields of the references (e.g., orientation films, and etching indium phosphide semiconductor structures), and the lack of a suggestion or motivation to combine the references, these references are not believed to be combinable. Therefore, reconsideration of the rejection is respectfully requested.

Claims 10 and 11 depend from claim 8. The dependent claims are believed to be allowable for at least the reasons given for claim 8. The Examiner’s reconsideration of the rejection is respectfully requested.

For the forgoing reasons, the application, including claims 8-21, is believed to be in condition for allowance. Early and favorable reconsideration of the case is respectfully requested.

Respectfully submitted,

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